

CLAIMS

1. A method of transferring data from a distributor to a plurality of recipients comprising the steps of:

(a) broadcasting unreceived data to said recipients;

(b) repeating step (a) until a time for transferring said unreceived data by point-to-point communication with said recipients obtains a predetermined relationship to a time for said broadcasting; and,

(c) thereafter, transferring said unreceived data by point-to-point communication with at least one said recipient.

2. The method of claim 1 wherein the step of repeating said broadcasting of unreceived data until a time for transferring said unreceived data by point-to-point communication with said recipients obtains a predetermined relationship to a time for said broadcasting comprises the steps of:

(a) estimating a time to transfer said unreceived data by point-to-point communication with said recipients, and

(b) repeating said broadcasting of unreceived data if said time to transfer said unreceived data by point-to-point communication is greater than said time to broadcast said data.

3. The method of claim 2 wherein the step of estimating a time to transfer said unreceived data by point-to-point communication with said recipients comprises the steps of:

(a) polling at least one recipient to identify for unreceived data said recipient;

(b) estimating a time to successfully transfer said unreceived data to said recipient by point to point communication; and

(c) summing said estimated times to successfully transfer said unreceived data to recipients reporting unreceived data.

4. The data transfer method of claim 1 wherein the step of repeating broadcast of said unreceived data until a time for transferring said unreceived data by point-to-point communication with said recipients obtains a predetermined relationship to a time for said broadcasting comprises the steps of:

(a) estimating a time to transfer said unreceived said data by point-to-point communication with said recipients,

(b) estimating remaining unreceived data following an additional broadcast of said data; and

(c) rebroadcasting said unreceived data if said time to transfer said unreceived data by point-to-point communication with said recipients is greater than a sum of said time to broadcast said data and a time to transfer said remaining said unreceived data by point-to-point communication.

5. The method of claim 4 wherein the step of estimating a time to transfer said unreceived data by point-to-point communication with said recipients comprises the steps of:

(a) polling at least one recipient to identify unreceived data for said recipient;

(b) estimating a time to successfully transfer said unreceived data to said recipient by point to point communication; and

(c) summing said estimated times to successfully transfer said unreceived data to recipients reporting unreceived data.

6. A method of transferring a plurality of data units from a distributor to a plurality of recipients comprising the steps of:

(a) designating a representative recipient;

(b) broadcasting unreceived data units to said recipients;

(c) repeating step (b) until said representative acknowledges successful receipt of said plurality of data units;

(d) polling at least one said recipient to identify data units not successfully received by said polled recipient; and

5 (e) transferring said unreceived data units to said polled recipient by point-to-point communication.

7. The method of claim 6 wherein the step of designating a representative

10 recipient comprises the steps of:

(a) broadcasting a plurality of data units to said recipients;

(b) polling at least one said recipient to establish success in receiving said data units; and

(c) designating as said representative said recipient having said success most representative of said success of said plurality of recipients.

8. The method of claim 6 wherein the step of designating a representative

recipient comprises the steps of:

20 (a) broadcasting a plurality of data units to said recipients;

(b) polling a first recipient following a broadcast of said data units to identify said unreceived data units for said polled recipient;

(c) repeating step (b) for a plurality of recipients; and

(d) designating as said representative said recipient reporting said unreceived data most representative of said unreceived data reported by said polled recipients.

25 9. The method of claim 6 further comprising the steps of:

30 (a) a first recipient reporting success in receiving said data units from said first broadcast; and

(b) another recipient reporting success in receiving said data units from another broadcast.

10. A method of transferring data from a data distributor to a plurality of data

5 recipients comprising the steps of:

- (a) broadcasting unreceived data to said recipients;
- (b) polling at least one said recipient to identify unreceived data;
- (c) estimating a time for transferring said unreceived data to said plurality of recipients by point-to-point communication with said recipients;
- (d) repeating steps (a) through (c) until said point-to-point communication time achieves a predetermined relationship to a time required to broadcast said data; and,
- (f) thereafter, transferring said unreceived data by point-to-point communication with said data recipients.

11. The method of claim 10 wherein the step of polling at least one recipient following a broadcast of said data to identify said unreceived data comprises the steps of:

- 20 (a) polling a plurality of said recipients following a broadcast of said data to identify said unreceived data for each said polled recipient;
- (b) identifying a representative recipient reporting said unreceived data most representative of said unreceived data reported by all polled recipients; and
- (c) said representative recipient reporting the identify said unreceived data on behalf of all said recipients following a subsequent broadcast.

12. The method of claim 10 wherein the step of polling at least one recipient following a broadcast of said data to identify said unreceived data comprises the steps of:

- (a) polling a first recipient following a broadcast to identify said unreceived data for said polled recipient;
- 5 (b) polling another recipient following another broadcast of said data to identify said unreceived data for said another polled recipient;
- (c) repeating step (b) for all polled recipients;
- (d) identifying a representative recipient reporting unreceived data 10 most representative said unreceived data reported by said polled recipients; and,
- (e) thereafter, said representative recipient reporting said unreceived data for said recipients following a broadcast of said data.

15 13. The method of claim 10 wherein the step of repeating said broadcasting of said unreceived data until said time to transfer said unreceived data by point-to-point communication with said recipients achieves a predetermined relationship to said time for said broadcasting comprises the steps of:

- (a) determining a time to transfer said unreceived data by point-to-point communication with each said recipient,
- 20 (b) estimating remaining unreceived data to be transferred after an additional broadcast of said data; and
- (c) broadcasting said unreceived data again if said time to transfer said unreceived data by point-to-point communication with said recipients is greater than a sum of said time to broadcast said data and a time to transfer said estimated remaining unreceived data by point-to-point communication.

25 14. The data transfer method of claim 10 wherein the step of repeating said broadcasting of said unreceived data until a time for transferring said

unreceived data by point-to-point communication with said recipients achieves a predetermined relationship to a time for said data broadcasting comprises the steps of:

- 5 (a) determining a time to transfer said unreceived data by point-to-point communication with each recipient, and
- (b) repeating said data broadcasting if said time to transfer said unreceived data by point-to-point communication is greater than said time to broadcast said data.

10 15. The method of claim 10 further comprising the step of transmitting said unreceived data by point-to-point communication following a predetermined number of broadcasts of said data.

15 16. A method of transferring data from a data distributor to a plurality of data recipients comprising the steps of:

- 20 (a) broadcasting unreceived data to said recipients;
- (b) polling said recipients to identify unreceived data;
- (c) identifying a representative recipient reporting unreceived data most representative of said unreceived data reported by said polled data recipients;
- (d) estimating a time for transferring unreceived data to said plurality of recipients by point-to-point communication with each recipient;
- (e) rebroadcasting said data to said recipients if said estimated time to transfer said unreceived data by point-to-point communication is less than a time required to broadcast said data;
- (f) polling said representative to identify said unreceived data; and
- (g) repeating steps (c), (d), and (e) until said estimated time to transfer said unreceived data by point-to-point communication is less than a time required to broadcast said data; and

(h) thereafter transferring said unreceived data by point-to-point communication with said data recipients.

17. A method of transferring a plurality of data units from a distributor to a plurality of recipients comprising the steps of:

- (a) broadcasting a plurality of data units to said recipients;
- (b) polling at least one said recipient to establish success in receiving said data units;
- (c) comparing said success of at least two recipients;
- (d) designating as a representative said recipient having said success most representative of said success of said plurality of recipients;
- (e) broadcasting data units to said recipients;
- (f) repeating step (e) until said representative acknowledges successful receipt of said plurality of data units;
- (g) polling at least one said recipient to identify data units not successfully received by said recipient; and,
- (h) thereafter, transferring said unreceived data units to said recipient by point-to-point communication.

18. A method of transferring a plurality of data units from a distributor to a plurality of recipients comprising the steps of:

- (a) broadcasting said plurality of data units to said recipients;
- (b) a first recipient identifying unreceived data following a broadcast of said data;
- (c) rebroadcasting said plurality of data units to said recipients;
- (d) another recipient identifying unreceived data following said rebroadcast of said data;
- (e) comparing said unreceived data identified by said recipient and said unreceived data identified by another recipient;

(f) designating as representative recipient a recipient reporting unreceived data most typical of unreceived data reported by said recipients;

(g) broadcasting said data units until said representative acknowledges successful receipt of said plurality of data units;

5 (h) polling at least one said recipient to identify data units not successfully received by said recipient; and,

(i) thereafter, transferring said unreceived data units to said recipient by point-to-point communication.

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19. A method of transferring a plurality of data units from a distributor to a plurality of recipients comprising the steps of:

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(a) designating a representative recipient;

(b) broadcasting a data unit to said recipients;

(c) repeating step (b) until said representative acknowledges successful receipt of said data unit;

(d) repeating steps (b) and (c) until said representative acknowledges successful receipt of said plurality of data units;

(e) polling at least one said recipient to identify data units not successfully received by said polled recipient; and

20 (f) transferring said unreceived data units to said polled recipient by point-to-point communication.

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25 20. The method of claim 19 wherein the step of designating a representative recipient comprises the steps of:

(a) broadcasting a plurality of data units to said recipients;

(b) polling at least one said recipient to establish success in receiving said data units; and

(c) designating as said representative said recipient having said success most representative of said success of said plurality of recipients.

5 21. The method of claim 19 wherein the step of designating a representative recipient comprises the steps of:

- (a) broadcasting a plurality of data units to said recipients;
- (b) polling a first recipient following a broadcast of said data to identify unreceived data for said polled recipient;
- 10 (c) repeating steps (a) and (b) for a plurality of recipients; and
- (d) designating as said representative said recipient reporting said unreceived data most representative of said unreceived data reported by said polled recipients.

15 22. The method of claim 19 further comprising the steps of:

- (a) a first recipient reporting success in receiving said data units from said first broadcast; and
- (b) another recipient reporting success in receiving said data units from another broadcast.

20 23. A method of transferring a plurality of data units from a distributor to a plurality of recipients comprising the steps of:

- (a) broadcasting a plurality of data units to said recipients;
- (b) polling at least one said recipient to establish success in receiving said data units;
- 25 (c) designating as a representative said polled recipient having said success most representative of said success of said plurality of recipients;
- (d) broadcasting a data unit to said recipients;

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(e) repeating step (d) until said representative acknowledges successful receipt of said data unit;

(f) repeating steps (d) and (e) until said representative acknowledges successful receipt of said plurality of data units;

5 (g) polling at least one said recipient to identify data units not successfully received by said recipient; and,

(h) thereafter, transferring said unreceived data units to said recipient by point-to-point communication.

10 24. A method of transferring a plurality of data units from a distributor to a plurality of recipients comprising the steps of:

(a) broadcasting said plurality of data units to said recipients;

(b) identification of unreceived data by a first recipient following said broadcast of said data;

15 (c) rebroadcasting said plurality of data units to said recipients;

(d) identification of unreceived data by another recipient following said rebroadcast of said data;

(e) comparing said unreceived data identified by said recipient and unreceived data identified by said another recipient;

20 (f) designating as representative recipient a recipient reporting unreceived data most typical of unreceived data reported by all recipients;

(g) broadcasting a data unit until said representative acknowledges successful receipt of said of data unit;

25 (h) repeating step (g) until said representative acknowledges successful receipt of said plurality of said data units;

(i) polling at least one said recipient to identify data units not successfully received by said recipient; and,

(j) thereafter, transferring unreceived data units to said recipient by point-to-point communication.

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